

(257)
CASE

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EPILEPSY,

OCCASIONED BY IRRITATION IN THE SOCKET OF A TOOTH.

WITH REMARKS.

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Read on Thursday, Jan. 30, 1851.

THE patient, Thomas Bell, 45 years old, a man of large heavy frame, though not plethoric or fat, and of a somewhat phlegmatic temperament, had been employed for six years and a half as a warder in Millbank Prison, having formerly served in the Royal Artillery force. His habits were temperate, and he had generally enjoyed perfectly good health; his last illness having been ague, from which he suffered while stationed at Woolwich in 1839. He had never been subject to headache, giddiness, fits, or other nervous affection, previous to the attacks presently to be described.

In the month of August 1850, he was sent, in charge of convicts, from Millbank Prison to Shorncliffe Barracks Prison, near Folkestone; and while there—namely, about the end of October—being otherwise in good health, began to suffer from toothache. On the evening of the 4th November, at his request, Mr. Chatfield, the medical officer of the prison, examined the painful tooth, the second upper molar of the right side, but, on account of its very decayed state, and the want of light, declined to remove it then: he applied strong nitric acid, telling the patient to come again the next day. After the acid was applied, the pain ceased, and the patient thought no

more of the tooth; but, on the 6th November, he felt a twitching of his right cheek, lasting four or five minutes, and recurring three or four times in the course of the day. At these times, when the twitching had reached a certain degree of intensity, his jaw became locked, and he lost the power of speech; but he had no pain in the head, giddiness, or sense of stupor. The paroxysms of spasm in the muscles of the right side of the face and jaws recurred during the next day (Nov. 7th), and on the following day, the fourth after the examination of the tooth by Mr. Chatfield, the twitching became more violent, and his jaw locked; he had the sensation of all his teeth on the right side falling out, and then lost consciousness. A strong convulsive fit ensued, which lasted half an hour: the same night he had a second fit. In this attack he was seen by Mr. Chatfield, who describes it as having had all the characters of an epileptic seizure, with more marked distortion of the right than of the left side of the face; the right corner of the mouth being drawn towards the right ear. A third fit of the same kind followed within half an hour after his recovering from the second. In the intervals between the fits, and after the third, he was sensible. A full dose of henbane was given

him, and he slept well that night. The next morning Mr. Chatfield, with great difficulty, extracted the tooth, together with a piece of bone, lying between the fangs, and firmly united to them by ossified periosteum.

There was no renewal of the fits during the remainder of the patient's stay at Shorncliffe. On the 19th November he returned to London, and resumed his duties at Millbank Prison. For nearly three weeks he remained well; but on the 7th December, in the middle of the day, he again felt the "twitching" in the right cheek. This subsided on the application of hot cloths: he then became aware of something projecting from the socket of the extracted tooth, and with his finger pulled out a piece of dead bone $\frac{1}{4}$ inch long and 1-6th inch broad, which he preserved. Some "matter," he says, escaped from the socket at the same time. In the course of the afternoon and evening the spasmodic twitching of the face recurred several times, and the jaw became locked each time. He went to bed feeling well; but, at 2 A.M. (December 8th), he awoke with spasm in the cheek, rose to get a towel with which to rub his face, and quickly lost consciousness. His wife was awakened by his falling on the floor in a struggling fit, foaming at the nostrils and mouth. This was followed by a half stupid state, and then by sleep, in the midst of which a second fit of convulsions occurred. At 6 A.M. he was visited by Mr. Hunt,* of Tachbrook Street, who found him with a flushed face, the veins of his forehead turgid, his mouth apparently drawn slightly to the right side, and his mind confused. While Mr. Hunt was with him, spasmodic twitchings began in the right cheek, visibly extended over that side of the head and neck, and thence to the whole body: the right half of the body being more strongly convulsed than the left. This fit lasted only five minutes. Venesection to the amount of sixteen ounces was performed. On first recovering from the fit he was sensible, but soon fell asleep, and slept several hours. Mr. Hunt gave him a mixture, which contained compound spirit of sulphuric

ether and ammonia, directing that a dose should be taken whenever the accession of a fit should threaten.

At 4 o'clock in the afternoon of the 8th I first saw him, at the request of Mr. Hunt. The fits had not returned. He felt weak, and his head heavy, with a dull pain in the forehead, chiefly on the right side. His pulse was of natural volume and frequency, and very soft. His skin and tongue were in a natural state. All symptoms of disordered cerebral function were absent. His jaw was not painful, nor tender on pressure being made over it externally, and at this time it was not particularly examined. Only an aperient of calomel and jalap was ordered, which acted freely the same evening.

The same night, between 10 and 11 o'clock, he suffered a return of the epileptic seizure. He had recovered from it at midnight, when Mr. Hunt saw him, but his mind was still confused; his mouth was more drawn towards the right side than it had been after the previous fit, and he complained of pain in the right ear, behind it, and in the forehead and cheek on the right side. The acetum cantharidis was now applied to the nape of the neck.

I visited him with Mr. Hunt at 4 P.M. on the 9th December. He still complained of pain in the ear and of common headache. The jaw being more closely examined, a large open cavity was found, from which the tooth, and subsequently the piece of bone, had been drawn. The gum around was slightly tumid, and the alveolar process was felt within the cavity, bare, but apparently not dead. There was a slight puriform discharge from this cavity. Behind it was a much smaller opening in the gum, leading to a stump.

It did not appear advisable to interfere further with the wound in the jaw, since no removable cause of irritation could now be discovered; but, as a measure of precaution, lest the irritation in the upper jaw-bone should induce deeper-seated and more serious mischief, it was agreed that he should take two grains of calomel every six hours. I saw him with Mr. Hunt on the 11th, and again on the 16th December. At the latter date he had lost all uncomfortable feeling in his head, the fits had not returned, and the openings in the gum and alveolar process of the upper jaw were closing; but he was feeble,

* I have much pleasure in mentioning my obligations to Mr. Hunt and Mr. Chatfield for the knowledge of very many of the particulars of this case, as well as for the kind permission to communicate them to the Abernethian Society.

and suffering from ptyalism; the mercurial pills having, through mistake, been continued longer than was intended. He was now ordered to take quinine, and a nourishing diet. He soon regained his strength, and, in the course of a few days, returned to his duties at Millbank Prison.

He remained quite well until the 22d of February, when he had another fit. This occurred between 8 and 9 o'clock in the morning, while he was on duty, and was preceded for about ten minutes by the usual warning symptoms. He had a return of these symptoms in the course of the next day, but no fit followed. On the 24th or 25th of February his mouth was examined: there was still a small opening in the situation of the socket from which the tooth had been extracted in November; and in the opening a particle of bone, nearly detached, was detected by the fingernail. This was removed. The opening in the gum soon afterwards closed, and the part has remained sound. Since February he has had no fit or symptom of nervous disturbance of any kind or degree, and at the present time (September 16th) is in perfect health.

REMARKS.—It has long been the received doctrine in medicine that epilepsy, in many instances, depends primarily on some irritation or disturbance in a part of the body distant from the central organs of the nervous system,—in other words, on an eccentric cause. Yet the records of medicine contain comparatively few clearly detailed cases of epilepsy occurring after the period of childhood in which the dependence of the disease on such eccentric cause was satisfactorily traced. In instances where the presumed local cause consisted in a disordered state of one of the abdominal or pelvic viscera, there has often been room for questioning whether this local visceral disorder and the epileptic seizures really bore to each other the relation of cause and effect; and, where an obviously independent local irritation, such as mechanical injury of a nerve or nervous fibres, has given rise to convulsive affections of muscles, these effects have been more frequently of the nature of tetanus, or local persistent spasm, than of recurring fits of epilepsy; or, if they have possessed the latter character, the circumstances attending them and their

symptoms have very rarely been described in detail. This remark applies especially to epilepsy occasioned by irritation of the dental or maxillary branches of the fifth nerve.* The record of a well-marked instance could, therefore, hardly be superfluous or useless. But I have had an additional reason for thinking the foregoing case worthy of admission into the Transactions of the Abernethian Society, in the belief that some of the phenomena it presented may afford a hint for diagnosis in future cases of similar or analogous nature.

The dependence of the epileptic seizures in this instance on irritation of a filament of the dental branch of the superior maxillary nerve can scarcely be doubted. The patient had never suffered from such attacks—nor, indeed, from any nervous ailment—previous to the month of November last, when the irritation about the fangs of the tooth had evidently reached a high degree of intensity; a long intermission followed the extraction of the tooth; the attacks were renewed on two occasions simultaneously with the exfoliation of portions of the alveolar process; and they finally ceased when the socket in the jaw-bone closed, and the gum completely healed over it. Moreover, in each attack, there was this remarkable feature, that the convulsive movements commenced in the muscles immediately contiguous to the seat of irritation, and spread thence to the rest of the body. And lastly, there was an absence of all symptoms of disease in the encephalon, or other parts, to which the convulsive seizures could be referred; the headache and drowsiness following one or two of the fits being obviously nothing more than the condition of imperfect coma which so commonly succeeds to an epileptic seizure, in whatever way caused.

Assuming, then, that the attacks were indubitably caused by the irritation in the alveolus of the tooth, the complete development of the epileptic paroxysms, with all their essential characters, seems to me worthy of notice. The general convulsions of the muscles of the body were attended by complete

* See the cases related or cursorily mentioned by Mr. *Tomes* (*Dental Surgery*, pp. 178 and 242); and by Dr. *Ashburner* (*On Dentition*, pp. 95 and 98).

loss of consciousness, and were succeeded by a state of stupor more or less profound; and nearly all the severe attacks which the patient suffered after his return to London occurred, as is so often the case with idiopathic epilepsy, during sleep, when the excitability of the spinal cord is being restored, and when it is no longer subject to the controlling influence of the mind. Several questions of great interest are suggested by such a case as this. Has, for example, the fact yet been well explained, that irritation of a centripetal nerve will excite, in one case, pain in the part supplied by it; in another case, the intense pain of "tic" in a more distant part; and, in a third case, no painful sensation, but only muscular movements? And again, what is the true explanation of the occurrence of coma in epilepsy as a consequence of the irritation of a sensitive nerve-filament? Does Dr. Marshall Hall's theory satisfactorily solve this difficulty? These questions, however, cannot be discussed here.

The feature of the case to which I would more especially direct attention is the complete accordance of the phenomena of reflex movement presented in it with those observed in experiments on decapitated animals, or in paralysed parts of the human body. When, in a decapitated frog or tortoise, a point in the skin of one limb is gently irritated, reflex movements are produced in that limb only—that is to say, in muscles supplied by motor nerves connected with the same part of the spinal cord to which the sensitive or centripetal nerve conveys the impression from the irritated skin. In proportion as the part is irritated more strongly, the movements extend to other limbs, and at length to the whole body of the animal. In cases of paraplegia in the human subject, too, tickling or otherwise slightly irritating the skin of one foot causes a slight movement of that foot, perhaps only of the toes: if the irritation be stronger, the whole limb is retracted; and, if the irritability of the spinal cord at the same time be great, both limbs will be forcibly drawn up: so, in this case of epilepsy, the first effects of the irritation in the alveolus was spasmodic movement of the muscles of the cheek of the affected side, then of the tongue and jaw: and increase of the influence on the nervous centre was

manifested, not merely by the loss of consciousness, but also by extension of the convulsions, first over the side of the head and face, and thence to the whole body; it being still observed, however, that the movements were stronger on the side of the irritation than on the opposite side.

In other recorded cases, where the effects of irritation of a dental filament of the fifth nerve have been more limited, they have been distinctly localised in the muscles of the face and jaw on the same side with the irritating cause, or, beginning in these parts, have extended only to the muscles of the neck and shoulder of the same side, which receive their motor nerves from the nearest part of the spinal cord. Thus, in the fourth volume of the *Medico-Chirurgical Transactions*, there is a case related by Mr. John Mitchell, of Kington, Herefordshire, in which spasmodic twitches, commencing in the left side of the face and tongue, extended, in the more severe paroxysms, to the entire left side of the head and neck, to the left shoulder and arm, and left side of the thorax, and were ultimately relieved by the extraction of several decayed teeth from the left side of the upper jaw. And in the following case, communicated to me by my friend Dr. Kirkes, the only muscles excited to spasmodic action by irritation of a dental nervous filament were those closing the jaws. "A healthy elderly lady went to have one of her back teeth stopped. The tooth was perfectly comfortable the same afternoon and evening; but in the night the lady awoke with a sensation of difficulty in opening her mouth. This continued; and, in the morning, she was almost unable to separate the jaws so as to take any breakfast. The jaws became more and more fixed during the day, and continued so all the night, rendering the introduction of food almost impossible. She naturally attributed this singular condition to the stopped tooth, though there was not the least pain or sense of discomfort in this or any of the teeth. She proceeded early the second morning to her dentist, who had great difficulty in opening her jaws sufficiently to enable him to get at the tooth, which he then removed, when, almost instantaneously, the rigidity of the jaws ceased, and never returned. It was not ascertained whether the rigid state of the jaws was

due to an affection of the museles of both or only one side of the face.”*

Such cases as these, taken in conjunction with that of the warder at Millbank Prison, illustrate in a striking manner the remark of Dr. Watson, that, in cases of epilepsy, it is expedient to observe “what museles or sets of museles are first affected by the spasm, and in what part the warning ‘aura’ (if there be any) arises; because, by accurately noting these particulars, we may, perhaps, be led to a knowledge of the part or organ in which the irritation operates; and, if we know the seat of the irritation, we shall be more likely to know its nature and its cure.” The first view of such cases further suggests the hope that, by a more careful application of this principle, cases of epilepsy, and other nervous disorders, which now too often baffle our efforts at cure, might more frequently be traced to local causes, especially irritation about the teeth, and thus more frequently be brought under the influence of remedial measures. The principle is, indeed, an important one. The possibility of epilepsy, local muscular spasm, even tetanus, and certainly neuralgia, being dependent on eccentric irritation, and of the seat of the irritation being traced in the manner described, ought to be borne in mind when cases of these disorders are investigated. And yet it is not to be expected that the cause of the disease and its cure *will* be thus discovered, except in comparatively rare instances. In the majority of cases of epilepsy, certainly, no warning spasm or “aura” ushers in the fit. And when these premonitory symptoms do exist, they serve, as Dr. Watson’s words indicate, only occasionally, not constantly, as a guide to the seat of the irritation on which the attack depends. For, although the warning “aura” and the spasms in some cases result from the reflected action of an eccentric irritation seated in the part where they show themselves, they in other cases are occasioned by irrita-

tion in a distant part of the body, or even by a general or a centric cause. In the latter cases the locality of the premonitory symptoms appears to depend on a peculiar excitability of the particular portion of the nervous centres which presides over the affected nerves and museles; this excitable segment of the brain or spinal cord being the first to react under the influence of the distant or centric cause of irritation.

The probable pathology of the cases last referred to, as regards the precursory spasms or morbid sensations, is illustrated by the analogous instance of local spasms. There are certain forms of spasm of frequent occurrence which seem in most cases to depend on this morbid excitability of the particular part of the nervous centres engaged in their production. Thus laryngismus stridulus is not caused by one special kind of irritation, or by irritation of one special nerve. The disposition to the spasm is the only fixed character of the disease: the cause exciting it may act on almost any centripetal nerve—in the teeth, in the stomach, in the intestines, or even in the skin: it may be an impression on a nerve of special sense, or an emotion of the mind. This has been well elucidated by Dr. Marshall Hall; and the same principle is made apparent, with regard to the spasmodic affections of the museles of the neck, by the following cases, which came under my own observation:—

Master H. A——, a boy five years old, had, from the age of three years and a half, been subject to fits of spasm in the museles of the neck, which drew the head backwards and towards the left shoulder, and, while they lasted, fixed it there. In the earlier attacks he had been seen by Dr. J. R. Farre, who had traced them to the irritation produced by undigested food in the alimentary canal. The boy’s mother told me that an emetic or an active purge immediately set free the contracted museles; and, by my own observation of several of the attacks, I was enabled to verify her statement. More recently I was called to see the nephew of this patient (the son of an elder brother), a child aged ten months, and found him labouring under a spasmodic attack of exactly the same kind. Purging had not relieved it: but he was cutting an incisor tooth. The gum was freely lanced, and

* A similar case is referred to by Haller, in the words “Ex usto dente, nervo denudato, maxilla clause.” But instances of simple trismus from such causes are not common; though several cases are recorded in which injury to the teeth or alveoli has been followed, first by trismus, and then by general tetanus (Tomes, Dental Surgery, p. 321; and Gall, London and Edinburgh Monthly Journal of Medicine, 1842, p. 422).

the muscles of the neck quickly became relaxed. With every tooth that this child afterwards cut he had a return of spasm in the muscles drawing the head backwards, which as often yielded to the same remedial measure. The last of his first set of teeth came through the gum some months ago, and since then he has not suffered from the spasmodic attacks.

It can scarcely be doubted that, in these two cases, in which spasm of the same muscles was excited by different eccentric irritations, the *locality* of the spasm was determined by the special excitability of that part of the spinal cord which is connected with the motor nerves of the cervical muscles. And in the same way the locality of the first movements, or of the warning "aura," in many cases of epilepsy, probably depends on a similar excitability of the nervous centre of the part, and therefore is not indicative of the seat of the eccentric exciting cause, even when such a cause exists.

The question practically most important is, then, whether the spasms or warning "aura" really due to eccentric irritation seated in or near the affected part have any peculiar characters by which they may be recognised. This question, I believe, has not even been touched upon by writers on epilepsy; and the recorded cases of epilepsy in which a cure was effected by the removal of diseased teeth or other sources of irritation, are so briefly related that even the circumstances which drew attention to the irritating cause are rarely alluded to; and, if local spasms are mentioned, they are never fully described. There are, however, some differences in regard to the seat of the spasms which in many instances would distinguish those caused by an irritation in the part itself from those depending on a morbid excitability of the corresponding portion of the brain or spinal cord. Spasms of the latter class would most frequently affect one or other of the parts which are known to be peculiarly liable to spasm from internal or centric causes, or from distant irritations,—such as the larynx, the muscles closing the jaws, the neck, the two hands, &c.; but spasms of the former class would not by preference be seated in such parts. On the other hand, these spasms, arising from immediate excito-motory action, would com-

monly commence in parts having a normal anatomical and physiological connection with nerves much exposed to irritation, such as those of the teeth and alveoli, or involved in wounds, cicatrices, or tumours; while the locality of the other class of spasms is, of course, independent of such circumstances. The distinctive characters of spasms due to irritation in or near the affected part, which are here indicated, would generally be obvious enough; and, in the cases where the precursory spasms of epilepsy have led to the discovery of the cause and cure of the disease, attention has doubtless been directed to them chiefly by the peculiarity of their situation and the presence there of a possible cause of irritation. In the case of the lady cured of epileptic fits by the removal of a tumour from a nerve beneath the gastrocnemius muscle, Dr. Short* appears to have sought the irritation there, not from a knowledge that anything abnormal existed, but simply from observing that the spasms always commenced in the muscles of that leg. The mere unusual seat of the spasms will, however, rarely be a sufficient guide. There were better means of diagnosis in the case related by Sir B. Brodie,† where, in addition to the fact of twitchings in one leg preceding the epileptic convulsions, there was the presence of a musket-ball in the leg, constituting an adequate cause of irritation to the nerves of the limb.

But it sometimes happens that the spasms arise in a part which is liable to be so affected from various causes, and yet is the seat of a probable or possible cause of irritation. Thus trismus is one of the forms of spasm frequently arising from centric or distant irritation, as where it precedes tetanus; but any irritation about the teeth would be adequate to cause it by direct reflex action; and if, in a case of epilepsy, the paroxysms were said to be preceded by lock-jaw, and the cause of the disease were not made clear by the history, we might be unable to decide whether the teeth were in fault or not. Under such circumstances, and in others of analogous nature, the case of the warder at Millbank Prison suggests that aid towards solving our doubts might be derived from a more careful inquiry

* Edinburgh Medical Essays and Observations, vol. iv. p. 334, 5th ed.

† On Local Nervous Affections, p. 15.

into the characters of the precursory spasms. It has already been noticed as a striking feature of that case, that the convulsive movements, beginning in the muscles of the cheek, *extended gradually* to those of the tongue and jaw, and thence to the side of the head and face generally, before they affected the whole body. The same peculiarity was observed in the analogous case of convulsive movements arising from the same cause, which has been quoted from the Medico-Chirurgical Transactions; and, in a third case, related by Sir E. Home, in the Philosophical Transactions for 1801, where irritation or inflammation of the nerve of one thumb, originating in mechanical injury, gave rise to spasmodic paroxysms ending sometimes in coma, the muscular spasms commencing in the thumb had the same character of extending gradually up the limb to the trunk. A little consideration, indeed, leads to the inference that local spasms ought generally to possess more or less of this character when they result from an eccentric irritation acting on healthy nervous centres, and producing, in accordance with physiological laws, reflex muscular movements in the parts with which the irritated nerve has normal relations. If such be the case—if spasms arising from irritation in or near the affected part commence constantly in the same muscle or limited group of muscles, and extend gradually to other muscles in the order of their contiguity, in consequence of the excitatory influence conveyed to the nervous centre extending progressively to the motor nerves arising from the next contiguous parts of the same lateral half of the spinal cord, this is a distinctive character; for local muscular spasms, which are the mere manifestation of the special excitability of the particular part of the brain or spinal cord presiding over the affected muscles, involve at once the whole group of muscles, or the muscles of an entire region, as the neck, or corresponding parts of the two sides of the body, and do not extend from a centre gradually to neighbouring parts.

How far the distinctions here pointed out are applicable as a means of diag-

nosis in epilepsy must be determined by future observation. But there certainly appear to me grounds for believing that, at least in some cases, both of local spasm and of epilepsy commencing with spasm, a closer attention to the mode of commencement and increase of the convulsive movements, as well as the consideration of the degree of liability of the particular part to spasm from internal causes, will aid in determining whether the cause is to be sought there, and relief attempted by the removal of a possible cause of irritation seated in or near the affected part.

In most cases of epilepsy the history will much aid the diagnosis of the cause, connecting the disease, perhaps, in its origin and course, with a special irritation. The inquiry into the history of a case of epilepsy is, indeed, generally speaking, a far more important mode of investigation than is the observation of the precursory symptoms; for in every variety of the malady the history may throw light on its pathology; while the warning "aura" and spasms are, in the majority of cases, not present, and may be absent even where the disease arises from an eccentric cause, if the brain and spinal cord are generally very susceptible of the morbid influence. Nevertheless, in a disease usually so intractable, any *occasional* aid to be derived from these symptoms cannot wisely be neglected; and the principal object of the foregoing remarks has been, by directing attention to the differences which the spasms in different cases present, to render any information they are capable of affording more easily available.

It is not improbable that the epileptic "aura" likewise presents differences corresponding with the conditions on which it depends; but the investigation of its characters will always be more difficult, since they can be learned only from the relation of the patient, while spasmodic movements may be observed by others, perhaps by the medical attendant himself, and may still for a time give valuable information after the patient has lost consciousness.

